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☒ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: **Metin Aydemir**	§	Attorney Docket No. **RA9-99-005**
Serial No.: **09/373,837**	§	Examiner: **Man U Phan**
Filed: **08/13/1999**	§	
For: **DELAYED-START METHOD FOR INTERNAL FLOW CONTROL IN PACKET SWITCHES**	§	Art Unit: **2665**

APPEAL BRIEF

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is submitted in support of the Notice of Appeal submitted in the present application on October 5, 2005 and following the Notice of Panel Decision from Pre-Appeal Brief Review dated December 5, 2005.

Certificate of Transmission/Mailing

I hereby certify that this correspondence is being facsimile transmitted to the USPTO at 571-273-8300 or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date shown below.

Typed or Printed Name: Jane Graham *Date:* December 30, 2005 *Signature:* Jane Graham

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REAL PARTY IN INTEREST

The real party in interest in the present Application is International Business Machines Corporation, the Assignee of the present application as evidenced by the Assignment, set forth at reel 010344, frame 0697.

RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellants, the Appellants' legal representative, or assignee, which directly affect or would be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Claims 1-6, 8-18 and 20-25 stand finally rejected by the Examiner as noted in the Final Rejection dated July 8, 2005.

STATUS OF AMENDMENTS

No amendment has been submitted subsequent to the final rejection.

SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention includes claims to a data flow control method within a data switch and a data flow control method and system within a data switch. The data switch includes a delayed-start system 200 which is depicted within Fig. 2 of the present application and described at page 8, lines 17 *et seq.* As described and illustrated therein, delayed-start system 200 includes functional entities and devices which are included within a conventional packet switch including a plurality of input sections 206, input ports 204, switching fabric 202, a plurality of output sections 216 and output ports 240. Data is received by delayed-start system 200 into input ports 204 from external telecommunications nodes. Input buffers 242, 244, 246 and 248, within input sections 208, 210, 212 and 214 respectfully, serve as queues for incoming data packets. Switching fabric output buffers 232 are provided to buffer data packets destined for one of the outputs sections during heavy or bursty traffic conditions.

The claimed invention in the present application addresses problems caused by overload in buffer occupancy levels among input buffers such as input buffers 242, 244, 246 and 248. Imbalances among input buffers may cause an overloaded condition to occur in some input buffers and thus result in data packets being discarded, requiring retransmission.

As described a page 10 of the present specification, line 1 *et seq.*, when one or more of output sections 218, 220, 222 or 224 becomes congested, the associated buffer controller delivers a congestion warning signal to back pressure control unit 226. For example, if output section 218 becomes overloaded, output controller 272 will deliver a congestion warning to backpressure control unit 226 indicating that output section 218 is congested. Backpressure control unit 226 will stop transmission of packets to the output section issuing the backpressure signal. Backpressure control unit 226 may also generate and deliver a backpressure signal to one or more input sections 208, 210, 212 and 214. As described at page 10, line 25 *et seq.*, when a backpressure signal is delivered to all input sections 208, 210, 212 and 214, which respond by temporarily halting transmission of packets to the congested output section specified in the backpressure signal itself. Only when the backpressure signal has been removed are input sections 208, 210, 212 and 214 free to resume transmission to the previously congested output section.

The delayed-start method of the present invention provides a particularized set of responses which are activated at the backpressure removal epoch. The delayed-start methodology of the present invention is described in the high level flow chart depicted within Fig. 3; however, the essence of this technique is best illustrated with respect to page 13 of the present specification, line 8 *et seq.* As described therein this system provides for a "delay" or "no delay" response to a release of backpressure. In the depicted embodiment described as noted above a plurality of occupancy thresholds (x1,x2, x3, etc.) may be utilized at step 308. In this case, the timer delay depicted at step 312 to be enforced prior to resumption of transmission is computed based upon the relative occupancy of a given buffer. Thus, if buffer occupancy is between 0 and x1 the timer is set to T1; if buffer occupancy is between x1 and x2 the timer delay is set to T2; and if buffer occupancy is between x2 and x3 the process proceeds to step 310 of the flow chart depicted within Fig. 3.

Thus, as described above, data transmission is paused from an input section to an output section in response to a detection of congestion, input buffer occupancy is determined during that pause, as set forth in Claims 10 and 22, and then a delay interval is computed based upon that input buffer occupancy. Data transmission is then resumed in accordance with that computed delay

interval. Further, as described above and as set forth expressly within Claims 8 and 20, the computed delay interval varies inversely with the determined input buffer occupancy.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 1-6, 8-18 and 20-24 are believed to be rejected by the Examiner under 35 U.S.C. §103(a) as being unpatentable over *Fichou et al.*, United States Patent No. 5,790,522. The Examiner's actual stated rejection is set forth within paragraph 6 of the final rejection is a rejection of Claims 1, 3-6, 22, 24, 26 and 28-30; however, as Applicant has only submitted 25 claims in the present application, Applicant's listing of the rejected claims is believed to be accurate and what was intended by the Examiner.

B. The Examiner's rejection of Claim 25 under 35 U.S.C. §103(a) as being unpatentable over *Fichou et al.* as applied above and further in view of *Ljungberg et al.*, United States Patent Number 5,493,566 is also to be reviewed upon appeal.

ARGUMENT

Fichou et al., United States Patent No. 5,790,522, discloses a method and system for controlling traffic congestion in a data communication network. Data is transmitted between nodes which include a switch fabric for switching network data between receive adapters connected to network node input lines and transmit adapters connected to network node output lines. Each adapter switch within the *Fichou et al.* reference defines a period of time for pausing transmission, as described at column 8, lines 2-8 thereof. As expressly set forth at column 8, lines 12 *et seq.*, there are only two timer values contemplated by *Fichou et al.* *Fichou et al.* expressly teach "Timer value T1 is used where an NRT packet is being transmitted when congestion is detected. Timer value T2 is used where an NR packet is being transmitted when congestion is detected." Thus, as expressly set forth within *Fichou et al.*, the time period for pausing a transmission is one of two fixed time values which are determined based upon the particular type of packet which is being transmitted once congestion is detected and not based upon input buffer capacity, as expressly set forth within in the claims of the present application.

Claims 1, 13 and 25 of the present invention set forth an express recitation of a determination of input buffer capacity of an input section and thereafter, computing a delay interval "based upon said determined input buffer capacity..." which may then be utilized to delay restart of data transmission in accordance with that computed delay interval. As *Fichou et al.* expressly teach the utilization of delay periods which are determined based upon the type of data being transmitted and as *Fichou et al.* is entirely silent with regard to any teaching regarding the computing of a delay interval based upon input buffer capacity, the Examiner's rejection of these claims over this reference is not believed to be well founded.

In addressing Applicant's arguments the Examiner notes that *Fichou et al.* teach the utilization of a spacing function mechanism for congestion control as depicted within Fig. 4 thereof. However, a simple examination of *Fichou et al.* reveals that the spacing mechanism described therein is utilized, as expressly set forth within *Fichou et al.* at column 7, line 2 *et seq.*, to "increase the switch input rate whenever required to deal with switch congestion problems." *Fichou et al.* go on to describe situations in which a low priority packet is awaiting transmission when a higher priority packet is received. In such a case, *Fichou et al.* teach that the spacing mechanism can be overridden so that the current low priority packet is transferred to the switch fabric as quickly as possible to make way for the higher priority packet. Nothing within the spacing system described by *Fichou et al.* shows or suggest in anyway the pausing of transmission and the calculation of a delay duration based upon a determination of input buffer capacity as expressly set forth within the claims of the present application. Consequently, the Examiner's application of the *Fichou et al.* reference is not believed to be well founded, whether considering the predetermined delay intervals or the spacing function described therein.

Applicant further respectfully request the Board to consider Claims 8 and 20 which expressly recite that the duration of the computed delay interval varies inversely with the determined input buffer occupancy. Applicant urges that is beyond cavil that delay intervals T1 and T2 described within *Fichou et al.* cannot be said to relate, inversely, directly or otherwise, to a determined input buffer occupancy and it is believed that the Examiner's rejection of these claims is inappropriate for this reason.

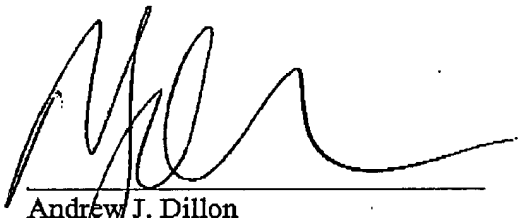
Finally, Claims 10 and 22 expressly recite the pausing of data transmission from an input section to an output section in response to detection of congestion and the determination of buffer occupancy during that pause. In applying the *Fichou et al.* reference to these claims the Examiner

merely notes that *Fichou et al.* teaches multiple input buffers. Applicant agrees that *Fichou et al.* teach multiple input buffers; however, nothing within *Fichou et al.* can be said to show or suggest a determination of buffer occupancy during a pause, as expressly set forth within this claim.

In summary, Applicant urges that each of the claims of the present application, in greater or less detail, expressly recite a detection of congestion during transmission of data and the temporary pausing of transmission and subsequent resumption of that transmission following the expiration of a delay interval which is computed based upon input buffer capacity as expressly set forth within the claims of this application. Consequently, Applicant urges that the Examiner's rejection of each of the claims in this application is not well founded and reversal of that rejection is respectfully requested.

Please charge the fee of $500.00 due for filing this Appeal Brief to **IBM Corporation Deposit Account Number 50-0563.** No extension of time is believed to be necessary. However, in the event an extension of time is required, that extension of time is hereby requested. Please charge any fee associated with an extension of time as well as any other fee necessary to further the prosecution of this application to **IBM Corporation Deposit Account Number 50-0563.**

Respectfully submitted,



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APPENDIX

1. A data flow control method within a data switch having at least one input section which includes an input buffer from which said input section transmits data to an output section through a switching fabric, said data flow control method comprising the steps of:

pausing data transmission from said input section to said output section in response to a detection of congestion within said switching fabric or within said output section;

determining input buffer occupancy of said input section during said pause;

computing a delay interval based upon said input buffer occupancy; and

delaying restart of data transmission from said input section to said output section in accordance with said computed delay interval.

2. The data flow control method of claim 1, wherein said data switch further includes an output buffer within said output section and switching fabric for routing data from said input section to said output section, and wherein said step of pausing data transmission from said input section is preceded by the steps of:

detecting a congested condition within said output buffer; and

in response to said detection of a congested condition within an output buffer, generating a backpressure signal within said switch fabric.

3. The data flow control method of claim 2, wherein said step of detecting a congested condition within said output buffer comprises detecting a backpressure signal from said switching fabric.

4. The data flow control method of claim 3, wherein said step of pausing data transmission from said input section is initiated in response to said input section receiving said backpressure signal.

5. The data flow control method of claim 2, wherein said detection of congestion within said output buffer comprises the step of detecting a high level of occupancy within said output buffer.

6. The data flow control method of claim 5, further comprising the steps of:

monitoring said output buffer for an indication of congestion;

detecting an indication of congestion within said output buffer;

generating a congestion indication signal in response to said step of detecting an indication of congestion;

delivering said congestion indication signal from said switching fabric to said input section; and

pausing data transmission from said input section to said output section in response to said delivery of said congestion indication signal.

7. (Cancelled)

8. The data flow control method of claim 1, wherein the duration of said computed delay interval varies inversely with said determined input buffer occupancy.

9. The data flow control method of claim 1, further comprising the step of defining a plurality of occupancy levels, including a high level and a low level, each uniquely corresponding to a range of readable buffer occupancy values.

10. The data flow control method of claim 9, wherein said data switch includes a plurality of input sections transmitting data to said congested output buffer, said method further comprising the steps of:

pausing data transmission from said input sections to said output section in response to a detection of congestion within said switching fabric or within said output section; and

determining buffer occupancies of each of said input buffers during said pause.

11. The data flow control method of claim 10, wherein said step of determining input buffer occupancies during said pause comprises the steps of:

reading an exact input buffer occupancy value for each of said input sections; and

in accordance with said occupancy level definitions, assigning one of said occupancy levels to each of said input sections in response to said step of reading an exact input section buffer occupancy value.

12. The data flow control method of claim 10, wherein said data switch further comprises an intelligent control device, and wherein said step of determining input buffer occupancies further comprises the steps of:

in a periodic manner within said intelligent control device:

reading an input buffer occupancy value for each of said plurality of input sections;

associating each of said input section buffer occupancy values with a buffer occupancy level; and

assigning said occupancy levels to corresponding input sections.

13. A data flow control system within a data switch having at least one input section which includes an input buffer from which said input section transmits data to an output section through a switching fabric, said data flow control system comprising:

means for pausing data transmission from said input section to said output section in response to a detection of congestion within said switching fabric or within said output section;

means for determining input buffer occupancy of said input section during said pause; and

means for computing a delay interval based upon said determined input buffer occupancy and delaying restart of data transmission from said input section to said output section in accordance with said computed delay interval.

14. The data flow control system of claim 13, wherein said data switch further includes an output buffer within said output section and switching fabric for routing data from said input section to said output section, and wherein said means for pausing data transmission from said input section further comprises:

means for detecting a congested condition within said output buffer; and

means for generating a backpressure signal within said switch fabric in response to detecting a congested condition within an output buffer.

15. The data flow control system of claim 14, wherein said means for detecting a congested condition within said output buffer comprises means for detecting a backpressure signal from said switching fabric.

16. The data flow control system of claim 15, wherein said means for pausing data transmission from said input section is initiated in response to said input section receiving said backpressure signal.

17. The data flow control system of claim 14, wherein said means for detecting congestion within said output buffer comprises means for detecting a high level of occupancy within said output buffer.

18. The data flow control system of claim 17, further comprising:

means for monitoring said output buffer for an indication of congestion;

means for detecting an indication of congestion within said output buffer;

means for generating a congestion indication signal in response to detecting an indication of congestion;

means for delivering said congestion indication signal from said switching fabric to said input section; and

means for pausing data transmission from said input section to said output section in response to delivering said congestion indication signal.

19. (Cancelled)

20. The data flow control system of claim 13, wherein the duration of said computed delay interval varies inversely with said determined input buffer occupancy.

21. The data flow control system of claim 13, further comprising a plurality of defined occupancy levels, including a high level and a low level, each uniquely corresponding to a range of readable buffer occupancy values.

22. The data flow control system of claim 21, wherein said data switch includes a plurality of input sections transmitting data to said congested output buffer, said system further comprising:

means for pausing data transmission from said input sections to said output section in response to a detection of congestion within said switching fabric or within said output section; and

means for determining buffer occupancies of each of said input buffers during said pause.

23. The data flow control system of claim 22, wherein said means for determining input buffer occupancies during said pause comprises:

means for reading an exact input buffer occupancy value for each of said input sections; and

means for assigning one of said occupancy levels to each of said input sections in accordance with said occupancy level definitions.

24. The data flow control system of claim 22, wherein said data switch further comprises an intelligent control device, and wherein said means for determining input buffer occupancies further comprises:

means for reading an input buffer occupancy value for each of said plurality of input sections;

means for associating each of said input section buffer occupancy values with a buffer occupancy level; and

means for assigning said occupancy levels to corresponding input sections.

25. A data flow control method within a data switch having at least one input section which includes an input buffer from which said input section transmits data to an output section through a switching fabric, said data flow control method comprising the steps of:

pausing data transmission from said input section to said output section in response to a detection of congestion within said switching fabric or within said output section;

determining input buffer occupancy of said input section during said pause;

computing a delay interval based upon said determined input buffer occupancy delaying restart of data transmission from said input section to said output section in accordance with said computed delay interval without regard to a data priority.

EVIDENCE APPENDIX

Other than the Office Action(s) and reply(ies) already of record, no additional evidence has been entered by Appellants or the Examiner in the above-identified application which is relevant to this appeal.

RELATED PROCEEDINGS APPENDIX

There are no related proceedings as described by 37 C.F.R. §41.37(c)(1)(x) known to Appellants, Appellants' legal representative, or assignee.